

description of the conidia being taken from Schroeter. In the Wisconsin specimens bodies were found on the surface of the leaves which may perhaps have been the conidia, but the material examined was not in sufficiently good condition to enable me to speak with certainty. The oospores are borne superficially on the leaves, and may be seen with the naked eye as dark brown specks. They readily fall from the leaves and collect in the form of a powder in herbarium envelopes. The endospores are very thick sometimes, in American specimens as thick as 4μ , which is thicker than reported European specimens. The exospore of other *Peronosporæ* is here represented by merely a thin film, whose surface is more or less roughened, but the oogonium wall itself, which is very thick and of a dark brown color, serves the purpose of an exospore, and instead of the spore escaping from the oogonium, as is generally the case, the oogonium falls from the leaf with the spore. The antheridia are plainly seen in Wisconsin specimens, even after having been dried for several months.

32. *Cystopus candidus*.

Also on *Nasturtium palustre* near Chicago, Arthur; and on *Sisymbrium canescens* with oospores, Arizona, H. H. Rusby.

33. *C. cubicus*.

On *Artemisia biennis*, Wisconsin, Trelease.

34. *C. Bliti*.

On *Amarantus blitoides*, Iowa, Arthur.

Besides the above, *P. nivea* and *P. Viciae* are mentioned in a Partial List of the Fungi of Wisconsin, by Dr. W. F. Bundy, in the first volume of the Geology of Wisconsin. The hosts on which these species grew is not mentioned, but Dr. Bundy kindly informs me that *P. Viciae* grew on cultivated peas in his garden, but he does not recollect the host of *P. nivea*, and unfortunately his specimens and notes on the subject were lost.

A Botanical Holiday in Nova Scotia. III.

BY T. J. W. BURGESS, M. D.

Led by the advertisements to believe that if we reached Port Mulgrave, on the Gut of Canso, in the evening, all we would have to do was to step off the cars on to the steamer for Sydney, we made no effort to catch the morning express, but loitered about Pictou and New Glasgow until the afternoon. Our train, an accommodation, certainly deserved the name. Time seemed to be no object, and at every station train-hands and passengers "piled off" to gather wild strawberries, which were very fine and plentiful. Along the track *Senecio aureus*, L. var. *lanceolatus*, Oakes, seemingly the leading form throughout the country, grew

luxuriantly, and in one spot *Amarantus retroflexus*, L. was abundant. After dark the air, woods and grass were ablaze with fire-flies, producing a charming and fairy-like effect as we *dashed* (?) along. 9:30 P. M. saw us at Mulgrave Wharf, where we learned to our intense disgust that the steamer only met the express, and then crossed to the opposite side of the Strait to lie at Port Hawkesbury until morning, when she left for Sydney. By the time that we had found out for ourselves that the ferryman lived on the other side also,—so that though our vessel lay only a mile away, she might as well have been twenty,—the little waiting-room had been locked up, and the train had gone back to the village. Imagine our feelings! dumped, with our baggage, in the middle of a pitch-dark night, on a wharf with not a house in sight around it,—the nearest tavern a mile up the track, and no one to give us aid or information. Finally the station operator, the only one of the railway employes who had taken the least trouble to help us in our dilemma, volunteered to show us the way to the hotel, an offer we gladly accepted. Lucky it was we had a guide, or some of the party (for we were not alone in our misery) would in all probability have broken their necks, a long piece of trestle-work forming part of the track about half a mile from the wharf. The hour was late when we reached our destination, but the landlord, Mr. Gillis, a genuine Highlander, and his wife, did all they could to make us comfortable. Though most of the luxuries of modern civilization were wanting, everything was scrupulously clean, and a snack, washed down by a glass of real Scotch whisky, and followed by a pipe, was no bad preparation for a good night's sleep.

A glorious sunshiny morning and a scene to delight an artist's soul completed the cure of our over-night disappointment. The hotel was close to the water flecked with white sails, and being situated on high ground gave a superb view both of the strait and of the western shore of Cape Breton. Within a quarter of a mile was a lovely cove, Pirates' Harbor, one of the places formerly frequented by the famous (or infamous) Captain Kidd, and, like many others, said to be the scene of the burial of his ill-gotten wealth. Breakfast disposed of, we were speedily off for a scramble up a rocky glen at the head of this cove. At what seemed, until right up to it, to be the end of the ravine, the stream we had been following made a sudden bend at right angles, and, turning our eyes, Hartley's Falls in all their picturesqueness were in full view. Tumbling out of a narrow chasm cut in the solid rock, the water, descending in a mass of fleecy foam, was

overhung by perpendicular cliffs, high up on which could be identified tufts of *Aspidium fragrans*, Swz., and *Asplenium Trichomanes*, L. This being the only locality known in the province for these ferns, though their situation presented no very great obstacles to a good climber, we willingly left the far from numerous bunches to gladden the eyes of future botanical explorers. About *Cystopteris bulbifera*, Bernh., also known only here, we were not so diffident, as it clustered abundantly about the base of the same rock. The entrance to the ravine furnished a new station for *Aspidium aculeatum*, Swz. var. *Braunii*, Koch, and further up grew *Viola canina*, L. var. *sylvestris*, Regel, while the wooded plateau above the falls was rich in *Habenaria Hookeri*, Torr. and *obtusata*, Richardson, and *Goodyera repens*, R. Br. and *Monotropa Hypopitys*, L. usurped the densely shaded banks. In the afternoon a walk to the wharf told us that this day's boat had struck a rock on her way up, and would be unable to sail again for some time; but so beautiful were our surroundings, and so rich in mosses our rocky glen, that the tidings were heard without regret. Our enforced stay was fully rewarded by the finding of the rare sea weed *Fucus serratus*, Linn., heretofore only known in America at Pictou, Nova Scotia, and Newburyport, Massachusetts, growing commonly on stones in the harbor; *Zygodon Lapponicus*, B. & S., *Hypnum cupressiforme*, L., *umbra-tum*, Ehrh., and *brevirostre*, Ehrh., and *Aulacomnion turgidum*, Schw. among rocks in the ravine; and *Splachnum rubrum*, L. in a swamp on top of the plateau.

On the third day, successful in catching a steamer, we crossed to Port Hawkesbury, and were at last in the island of Cape Breton, formerly a distinct province, but now a part of Nova Scotia. Morning brought a pleasant sail down the strait to St. Peter's canal, passing through which we entered the famed Bras D'Or. Pen of mine can do no justice to the beauties of this strange ocean lake, which, sheltered from the sea of which it forms a part, divides the island in two, and ramifies through it in a hundred different directions. Bays, inlets, and straits, with islands, peninsulas, and broken coast, were all there, while high above towered the hills and their ancient forests, a mass of verdure. North Sydney, the end of our voyage, lying across the harbor from Sydney proper, is a straggling and dirty, but lively business place, with a people the embodiment of kindness and hospitality. Being a coaling station, many foreign vessels touch there, and a saunter about the streets and docks brought to light a number of introduced plants. *Urtica urens*, L. was everywhere,

and *Lepidium ruderales*, L. and *Senebiera didyma*, Pers. fell little short of it in abundance. *Lamium purpureum*, L., *Fumaria officinalis*, L., and *Myosotis arvensis*, Hoff. were pretty common on ballast and seemed to be firmly established, while *Veronica Buxbaumii*, Tenore, and *Lamium amplexicaule*, L. were more localized, though also well fixed. *Papaver Rhoeas*, L., *Lepidium campestre*, R. Br., *Bellis perennis*, L., and *Achillea Ptarmica*, L. were noted, but very sparsely, and could not be considered as at all permanent. In the middle of a field, at least a mile from any house, was a large patch of *Primula veris*, L. in fine seed, but how it had got there we were unable to learn. A swamp just back of town proved a genuine "bonanza" in more ways than one. The black flies and mosquitoes were terrible,—so much so that from the extravasation of blood, the result of their biting there, my eyes were as black for some days as if I had come out second-best in a free fight. But if it abounded in insects it was also rich in plants, among others being *Aster nemoralis*, Ait., *Gaylussacia dumosa*, T. & G., *Eriophorum alpinum*, L., *Cladium mariscoides*, Torr., *Scirpus caespitosus*, L., *Rhynchospora fusca*, Roem. & Schultes, *Carex utriculata*, Boott, *Lycopodium inundatum*, L. var. *Bigelovii*, Tuck., and *Splachnum ampullaceum*, L. Careful search in a low wood brought to light a few specimens of *Pyrola minor*, L., and where pools had dried up on the sea shore was a form of *Callitriche verna*, L. *Euphrasia officinalis*, L. grew very freely both on the hillsides and in meadows, while boggy spots produced an abundance of *Juncus filiformis*, L. in good fruit.

Thinking it would never do to visit a coal region without inspecting a mine, we betook ourselves to the most extensive, known as the Old Sydney. After seeing all the works above ground, a descent was made of the shaft, seven hundred feet deep, and the subterranean wonders explored. Some of the workings have been carried for a long distance under the sea, but I found it quite impossible to realize that the waves of the mighty Atlantic were actually rolling above my head. One of the most interesting sights was the spacious underground stable, where they not only keep, but breed, their stock for use in the mine. I had fancied that the sight of such animals might be defective in some way, but was informed that whenever they had been taken above ground, after a time sufficient to get accustomed to the light, vision seemed quite normal. Not far from the mine was one of the "barrens" peculiar to the country, and this, after jotting down *Gnaphalium sylvaticum*, L., we next pro-

ceeded to examine. "Barrens," or "bake apple barrens,"—as they are called in the neighborhood, from their being the favorite resort of the "bake apple," the name by which *Rubus Chamæmorus*, L. is here known,—are extensive mossy tracts bordered by a growth of scraggy spruce, and covered in places with a low brush of ericaceous plants. They favor the coast, and are said to owe their origin to bush fires which have in times past swept the country. The one visited was particularly rich in the *Rubus* in all stages, from perfect flower to nearly mature fruit, and also enlarged our collection with *Poterium Canadense*, Benth. & Hook., *Prenanthes serpentaria*, Pursh, var. *nana*, Gr. *Solidago Virga-aurea*, L. var. *humilis*, Gr., *Aster Radula*, Ait., and *Comandra umbellata*, Nutt. The sandy shore below the mine furnished us with *Cakile Americana*, Nutt, and the shallow water of a little lake a few miles from town, with *Lobelia Dortmanna*, L., *Limnanthemum lacunosum*, Griseb., *Sparganium simplex*, Huds. var. *fluitans*, Gr., *Sagittaria heterophylla*, Pursh. and *Isoetes Tuckermani*, Braun.

Canada possesses too few historically famous places to sanction the missing of so well-known a one as Louisbourg. Accordingly conveyances were engaged to carry us over the twenty-five miles intervening between that place and Sydney, and a most enjoyable drive was the result, the road, though hilly, being good, pleasantly diversified with hill and dale, and generally shaded. By the way, just after starting was seen *Blitum Bonus-Henricus*, Reich., and in fields a little farther along *Digitalis purpurea*, L. A dwarf state of *Sparganium simplex*, Huds. var. *angustifolium*, Gr. occupied wet places on the higher lands, and *Carex rostrata*, Mx. low swamps between the ranges of hills, while in Black Brook, just where it crossed the road, *Nuphar pumilum*, Smith, was abundant. One of our horses having broken down, our progress was so delayed that we did not reach our journey's end until toward evening, and it was the following morning ere we found ourselves among ruins rich in historical recollections and in floral treasures. Listening to the mournful surges of old ocean,—a fitting requiem,—what a world of thought on the vanity of all things earthly did the prospect open. Twenty-five years of labor and thirty millions of lives had the French expended to make this place one of the strongest fortresses in the world; now it was but a heap of grass-grown ruins. Captured first by the hardy New Englanders under Pepperal, it was restored by the treaty of Aix-la-Chapelle, and again became the strong-hold of France on the Atlantic coast, and a key to the Gulf of St. Law-

rence. War re-opened, Wolfe sought the new world, and Louisbourg fell once more, and forever. A fiat was issued that the place should be destroyed. Buildings were blown up, walls torn down, and the once proud city reduced to a shapeless mass. Two years were needed to complete the work of destruction, and so thoroughly was it done, that to-day but a couple of stone arched casements remain unbroken, though the lines of many of the old fortifications may still be indistinctly traced. On our way along the shore a valuable find was made in *Iris tridentata*, Pursh. flourishing on a bank just above the sea, while some swampy ground skirting an outlying work known as the "Grand Battery," was literally a mass of *Microstylis ophioglossoides*, Nutt. The grass-slope back of the same work was white with the spikes of *Habenaria dilatata*, Gr., and *Lythrum Salicaria*, L. with *Carex panicea*, L. grew plentifully in the ditch surrounding it. *Hippuris vulgaris*, L. almost choked up the old moat encircling the main defenses and *Iris prismatica*, Pursh. enriched a low swale near by. A wet "barren" had added materially to the strength of the place on the seaward side, and in picking our way over this we stumbled across *Carex limosa*, L., *Calamagrostis Pickeringii*, Gr., and *Hypnum molle*, Dicks., while *Racomitrium lanuginosum*, Bird., was found on dry banks closer to the shore.

Retracing our steps to Sydney, and over the Bras D'Or, our next halt was made at Baddeck, with other Cape Breton scenes so well described by Charles Dudley Warner in his sketch "Baddeck and that Sort of Thing." Here, in a salt-water pond on the island forming the harbor were got *Zannichellia palustris*, L. and *Ruppia maritima*, L., and, on the sands surrounding it, a form of *Potentilla Anserina*, L., differing from our inland one in having a widely reflexed calyx and acheniæ forming dark purple heads as large as the ordinary run of wild strawberries. On the swampy shore of the mainland grew *Eleocharis pygmæa*, Torr., and *Poa serotina*, Ehrh., while the grassy hill slopes were gay with *Habenaria lacera*, R. Br., and, where at all shaded, with *Aspidium Noveboracense*, Swz.

Notes on Indiana Plants, 1883.

BY E. J. HILL.

The following notes have been selected from my note-book for 1883 as far as it relates to the flora of Indiana. Some of the species named are additions to those given in the Catalogue of the Plants of Indiana by the editors of the BOTANICAL GA-